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STUDY OF OFFICER TURBULENCE BASED ON OFFICER TAPE RECORDS

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Research Studies are special reports to military management. They are usually prepared to meet requests for research results bearing on specific management problems. A limited distribution is made--primarily to the operating agencies directly involved.

FOREWORD

The COMPUTERIZED MANPOWER SYSTEMS Task utilizes the growing body of psychological, mathematical, and computer technology in seeking solutions to manpower management problems. Task objectives are stated as follows:

1. To evaluate alternative manpower policies in the U. S. Army personnel system through the application of quantitative models.

2. To determine parameters for these models using both computer simulation and data processing techniques.

3. To solve personnel management problems relating to the inventory, allocation, and control of personnel in both current and future systems.

4. To develop computer-aided research methods and tools that increase the Army's in-house capability for responding to management research requirements.

ABSTRACT

The ~~present Research Study~~ report summarizes data on officer turbulence derived from taped personnel and reassignment records of officers reassigned in November 1964 when problems related to premature change of station of Army officers were of urgent concern to the Deputy Chief of Staff for Personnel. The data were analyzed primarily to identify critical factors in the personnel system both for immediate use by management and as a basis for manpower simulation studies. Continuation of the study was interrupted by the changing military situation.

ABSTRACT

Task research is conducted under RDT&E Project 2J024701A723, "Human Performance in Military Systems", FY 1967 Work Program.

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STUDY OF OFFICER TURBULENCE BASED ON OFFICER TAPE RECORDS

BRIEF

Requirement:

To analyze personal data, including assignment history, on officers reassigned (permanent change of station) during November 1964, with a view to identifying personal or system characteristics significant in premature reassignment.

Procedure:

Copies of magnetic tape maintained in the U. S. Army Data Services Command on officer personnel were obtained for November, 1964, and samples were constituted to be representative of varying degrees of turbulence: Group A, reassigned within the last 12 months; Group B, reassigned from 12 to 24 months prior to current reassignment; Group C, not reassigned in the last 24 months. Distributions of the three groups on a number of characteristics were prepared and the significance of each characteristic for turbulence was evaluated.

Findings:

Factors significant for turbulence were MOS, prior service overseas, marital status, active duty time, projected date of retirement, grade, date of RA appointment, pilot status, active federal service.

Nonsignificant factors were physical profile, race, component, date of availability.

The most effective combination for predicting turbulence vs. nonturbulence was date of birth, date returned to CONUS, and duty MOS. Almost as effective was a combination of temporary grade, control branch, and date returned to CONUS.

Utilization of Findings:

As analysis was completed, results were supplied to DCSPER for consideration in policy formulation. The data presented here and additional data for the FY 1964-65 period provided information used in the development of a flow model relative to the reduction of turbulence in officer assignment. The model can be an objective means of evaluating proposed modifications in policy and procedures in terms of effect on turbulence.

STUDY OF OFFICER TURBULENCE BASED ON OFFICER TAPE RECORDS

The premature reassignment of Army personnel which was occurring with distressing frequency in 1964 and 1965 was expected to have considerable adverse impact on military career attractiveness. This premature reassignment was commonly referred to as turbulence, and the personnel objective for Fiscal Year 1965 was announced by the Deputy Chief of Staff for Personnel to be the reduction of turbulence: "It is desired that every effort be made to reduce the number of permanent changes of station of Army personnel".[1] Representatives of the Office of Personnel Operation brought the turbulence problem to the attention of the U. S. Army Behavioral Science Research Office,[2] with particular emphasis on the problem of personnel being moved within or out of Continental United States before the end of their specified time.

In response to Army interest in turbulence, reassignment problems have been studied by the U. S. Army Behavioral Science Research Laboratory from several points of view. The present study was concerned with the empirical identification of officers who were most often reassigned. Reports on mathematical models for the evaluation of alternative rotation policies are provided elsewhere (1, 2, 3, 4, 5).

Since the Army is a diverse personnel system made up of many subgroups of people with non-interchangeable skills and qualifications, turbulence varies from group to group, depending upon the need for a given skill and the number of trained men available. Reduction of turbulence within a group by change of management policy or accelerated training programs could often be effected if the critical groups were known. Because assignment of officers was handled by appropriate career branches of the Officer Personnel Directorate, reassignment information obtained from the different branches was not always comparable. Since the common information used by the career management officers was maintained on magnetic tape by the U. S. Army Data Services Command, it was decided to obtain copies of the tape for selected months for use in identifying turbulent groups.

After this decision was made in 1964, the officer tape for November 1964 was obtained and examined in detail through frequency distributions and regression analyses. Tapes were also copied for January and June 1965, and plans were made to obtain a final record for June 1966. Meanwhile, as Vietnam operations expanded, turbulence became almost universal in the Army. The information obtained from the tapes was no longer timely. Records obtained in 1964 and early 1965 were not representative of 1966. With the increase in turbulence, there was a realization on the part of management that some premature reassignment had to be tolerated to meet high priority overseas commitments and to minimize repeated tours in Vietnam.

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[1] DCSPER-CB Memorandum for The Surgeon General, the Chief of Personnel Operations, The Adjutant General, the Provost Marshal General, the Chief of Chaplains, and each ODCSPER director, Subject: Personnel Objectives for FY 65, dated 29 June 1964.

[2] Designation prior to 1 March 1967 was U. S. Army Personnel Research Office (USAPRO).

Pertinent summary data were available for use in the analytical flow models developed by this office (1, 2, 3, 5). The summaries in the models have been used by Army policy makers. Decision has now been made within the Research Task to make no further analysis of the dated taped information, but rather to expand analytical efforts on other more immediate projects. Work completed prior to the decision is described in the present Research Study.

The work described was intended primarily as an exploratory study to detect critical variables (1) for immediate interim management use, (2) for planning a more comprehensive study of turbulence, and (3) for use in preliminary simulation studies.

DISTRIBUTIONS OF NOVEMBER 1964 SAMPLE

To obtain representative samples of turbulent and nonturbulent officers, all who changed stations (assigned within or out of CONUS) in November 1964 were selected from the master tape. Information about the subgroups who received a change of assignment in as little as 12 months following a previous change of station (Group A) was then compared with similar information about those who remained over 12 but less than 24 months (Group B), and those who remained over 24 months (Group C).

Previous changes of station for officers required to make a permanent change of station in November 1964 are shown below:

Group A (Most Turbulent)		Group B (Moderately Turbulent)		Group C (Least Turbulent)	
Date of Last PCS	Number of Officers	Date of Last PCS	Number of Officers	Date of Last PCS	Number of Officers
Oct 1964	38	Oct 1963	57	Oct 1962	18
Sept	30	Sept	27	Sept	14
Aug	37	Aug	19	Aug	14
July	36	July	31	July	10
June	35	June	31	June	13
May	27	May	13	May	6
Apr	42	Apr	11	Apr	3
Mar	43	Mar	12	Mar	5
Feb	35	Feb	11	Feb	3
Jan	31	Jan	11	Jan	3
Dec 1963	34	Dec 1962	18	Jan-Dec 1961	64
Nov	31	Nov	21	Before Jan 1961	27
TOTAL	419		262		180

No previous PCS N = 172

These distributions and those following include Warrant Officers, except as noted.

The chi square statistic was computed on observed frequencies in various categories. The chi square value, degrees of freedom, and percentages of each group in each category are shown in Tables 1 through 16. Values so large as to fall in the upper five percent of the chi square distributions are marked with an asterisk (*), those smaller as "not significant".

Table 1

PERCENTAGES OF EACH GROUP BY PHYSICAL STATUS

Lowest Number on Scale	Turbulence Group A	B	C
1	81	80	72
2	11	14	24
3	5	5	3
4	0	0	0
Other	2	1	0
Missing Data Cases	1	0	0

χ^2 = 6.20. Categories 1, 2, and 3. Not significant. (χ^2 of 9.49 required for significance at .05 level)

df = 4

Table 2

PERCENTAGES OF EACH GROUP BY MOBILIZATION MOS
(Warrant Officers Excluded)

MOS Group	Turbulence Group A	B	C
Comm. and Trans.	10	6	7
Command and Combat	46	44	29
Admin., Exec., and Tng. Svc.	10	6	12
Health Svc.	7	10	17
Procurement, Supply, Maint. and Rep.	9	8	7
Welfare and SS			
Fiscal Acctng and Budgeting			
Engineering, related Tech. Svc.	10	13	16
Professional, Semi-Technical Svc.			
Protective, Intell, and Invest.			
Missing Data Cases	1	0	0

$\chi^2 = 34.72$. Missing data cases omitted. (χ^2 of 18.31 required for significance at .05 level)

df = 10

Table 3

PERCENTAGES OF GROUPS WITH PRIOR OVERSEAS SERVICE

Months of Overseas Service	Turbulence Group A	B	C
0-9	1	2	0
10-19	8	7	4
20-29	3	5	4
30-39	14	14	7
40-49	9	10	7
50-59	4	8	13
60-up	18	30	52
Missing Data Cases	43	24	13

χ^2 = 118.07. Missing data cases omitted. 0-9 category omitted. (χ^2 of 18.31 required for significance at .05 level).

df = 10

Table 4

PERCENTAGES OF GROUPS BY MARITAL STATUS

Status	Turbulence Group A	B	C
Married	69	76	82
Single, no dependents	26	20	9
Other	4	4	4
Missing Data Cases	0	1	4

χ^2 = 20.41. Married vs single. (χ^2 of 5.99 required for significance at .05 level).

df = 2

Table 5

PERCENTAGES OF GROUPS BY ACTIVE DUTY TIME

Months of Active Duty	Turbulence Group A	B	C
0-49	46	29	9
50-99	23	19	12
100-199	23	42	43
200-up	7	11	35
Missing Data Cases	1	0	0

χ^2 = 159.25. Missing data cases omitted. (χ^2 of 12.59 required for significance at .05 level).

df = 6

Table 6

PERCENTAGES OF GROUPS BY PROJECTED DATE OF RETIREMENT

Date	Turbulence Group A	B	C
65-69	12	17	29
70-74	10	16	15
75-79	10	13	7
80-84	29	12	7
85-up	0	0	0
Missing Data Cases	50	42	41

χ^2 = 38.55. Last two rows not used. (χ^2 of 12.59 required for significance at .05 level).

df = 6

Table 7

PERCENTAGES OF GROUPS BY TEMPORARY GRADE

Grade	Turbulence Group A	B	C
COL	0	1	5
LTC	5	8	23
MAJ	11	15	29
CPT	38	38	22
1LT	14	18	7
2LT	23	5	0
WO	8	14	14

χ^2 = 183.96. WO omitted. (χ^2 of 18.31 required for significance at .05 level).

df = 10

Table 8

PERCENTAGES OF GROUPS BY PRIMARY MOS
(Warrant Officers Excluded)

MOS Group	Turbulence Group A	B	C
Comm. and Trans.	9	7	6
Combat	48	50	29
Admin., Exec., and Tng.	14	9	16
Health	7	10	20
Supply, Maint.	9	10	10
Spec. Service	3	4	4
Accounting	0	1	2
Engineering	2	2	3
Prof. and Scient.	1	2	3
Intell.	6	4	8

χ^2 = 42.32. (χ^2 of 28.87 required for significance at .05 level).

df = 18

Table 9

PERCENTAGES OF GROUPS BY RACE
(Warrant Officers Excluded)

Race	Turbulence Group A	B	C
White	94	92	97
Negro	6	7	3
Other	0	1	0

χ^2 = 2.75. Not significant. (χ^2 of 5.99 required for significance at .05 level).

df = 2

Table 10

PERCENTAGES OF GROUPS BY COMPONENT

Component	Turbulence Group A	B	C
RA	33	41	45
AR	64	55	50
NG	2	2	3
AUS	1	2	1

χ^2 = 10.90. Not significant. (χ^2 of 12.59 required for significance at .05 level).

df = 6

Table 11

PERCENTAGES OF GROUPS BY DUTY MOS
(Warrant Officers Excluded)

MOS Group	Turbulence Group A	B	C
Comm. and Trans.	42	19	3
Combat	16	17	10
Admin., Exec., Tng.	21	26	39
Health	7	9	18
Supply and Maint.	7	13	7
Spec. Svc.	3	4	5
Accounting	0	2	3
Engineering	1	3	4
Prof. and Scient.	1	2	1
Intell.	3	6	10

$\chi^2 = 134.99$. (χ^2 of 28.87 required for significance at .05 level).

df = 18

Table 12

PERCENTAGES OF GROUPS BY SECONDARY MOS
(Warrant Officers Excluded)

MOS Group	Turbulence Group A	B	C
Comm. and Trans.	52	36	25
Combat	16	21	19
Admin., Exec., Tng.	14	17	23
Health	1	2	8
Supply and Maint.	8	13	10
Spec. Service	1	0	1
Accounting	0	1	3
Engineering	2	2	5
Prof. and Scient.	1	2	1
Intell.	3	6	5
Missing Data Cases	1	0	0

$x^2 = 67.58$. (x^2 of 28.87 required for significance at .05 level).

df = 18

Table 13

PERCENTAGES OF GROUPS BY DATE OF AVAILABILITY

Date	Turbulence Group A	B	C
60-63	4	3	4
64	11	14	23
65	16	21	17
66	11	11	8
67-68	7	8	11
Missing Data Cases	51	42	37

χ^2 = 11.94. Not significant. Missing data cases omitted. (χ^2 of 15.51 required for significance at .05 level).

df = 8

Table 14

PERCENTAGES OF GROUPS BY DATE OF RA APPOINTMENT

Date	Turbulence Group A	B	C
35-49	4	8	22
50-54	5	9	7
55-59	10	11	8
60-64	11	7	2
Missing Data Cases	70	65	61

χ^2 = 53.46. (χ^2 of 12.59 required for significance at .05 level).

df = 6

Table 15

PERCENTAGES OF GROUPS BY PILOT STATUS

Status	Turbulence Group A	B	C
Aviator	10	16	4
Other	90	84	96

χ^2 = 17.91. (χ^2 of 5.99 required for significance at .05 level).

df = 2

Table 16

PERCENTAGES OF GROUPS BY ACTIVE FEDERAL SERVICE

Month	Turbulence Group A	B	C
0-29	23	6	0
30-49	15	12	6
50-99	24	16	12
100-199	19	38	26
200-up	18	27	57
Missing Data Cases	1	0	0

χ^2 = 170.78. (χ^2 of 15.51 required for significance at .05 level).

df = 8

Summaries were made for the three groups on other information, but because of much missing data or the seemingly remote relationship observed, the distributions are not shown here. A regression analysis designed to determine the combination of variables which characterizes the turbulent officer was performed. The variables included in the analysis were grouped in four categories: professional qualifications, length of service, assignment status, and personal problems. Several measures of each category are available in the officer tape. For this preliminary analysis the following variables were used:

Professional Qualifications

- Control Branch
- Basic Branch
- Duty MOS
- Primary MOS
- Pilot Status

Length of Service

- Temporary Grade
- Permanent Grade
- Months of Overseas Service
- Date of Birth

Assignment Status

- Date of Availability
- Date of Return to CONUS
- Expiration Date
- Projected Date of Retirement

Personal Problems

- Physical
- Marital Status
- Dependents

For the correlational analysis, the sample was restricted to commissioned officers. Since the professional qualifications variables were categorical and the number of cases in the sample limited, a dichotomy was formed from each variable. (It was planned to do additional work later within the broad groupings used here.) For each of the first four variables in this category, the officers were divided into (1) active combat potential or close support for combat, and (2) all others. The code of 1 was assigned to the combat classification, 0 to the others. Dates were coded by two digits for the year and a decimal value for the month; for example, April 1956 became 56.3. Pilot status was coded 1 for pilots, 0 for nonpilots; marital status 1 for married, 0 for not married; dependents 1 for dependents, 0 for no dependents; physical profile 1 for no rating below 1, 0 for all others. Grade was coded 1 for O-1, 2 for O-2, and so on through 6 for colonels. Turbulence was also dichotomized by dividing the officers in the sample into (1) those who had made a previous change of station since November 1962 and (2) those whose last previous change of station was in October 1962 or earlier. Thus, Groups A and B from the distributions shown on page 2 were coded 1; Group C plus those in the no previous permanent change of station category who had been in service more than two years were coded 0.

Intercorrelations of these variables with the date of last permanent change of station and with its turbulent-nonturbulent form (based on division at 24 months) are shown in Table 17. Multiple correlation coefficients resulting from various combinations of three variables are shown in Table 18. When a test selection was performed using the turbulent-nonturbulent dichotomy as the criterion, the combination of date of birth, date returned to CONUS, and Duty MOS was the most valid 3-variable grouping (R = .467). However, the categories of temporary grade, control branch, and date returned to CONUS made a combination almost as valid (R = .450, for the dichotomy) and was the most valid predictor of turbulence in its continuous form. Other combinations, utilizing MOS as the professional qualifications variable gave somewhat smaller multiple correlation coefficients.

The assignment officers of the various branches are presently obtaining data summaries which include the same variables shown here and are using them in filling reassignment quotas. Information reported here may emphasize what has already been recognized as a problem--the burden of frequent transfers is not borne equally by all MOS nor by officers in all grades. Reconsideration of the grade structure and the present rate of advancement might show ways to alleviate the problem.

If original plans had not been interrupted by the changing military situation, individual groups identified from the analysis of the officer tapes would have been examined more closely through the collection of follow-up information. It was thought alleviation of turbulence could result from judicious channeling of more persons to the areas where most movement occurred, either from new additions or by appropriately scheduled retraining. Projections were even made to the time when turbulence could be anticipated and avoided entirely. When the Army again reverts to peacetime status or when the war becomes as cold as it was in 1964, a reexamination of characteristics of officers involved in repeated station changes could lead to improved management of available manpower.

Table 17

MEANS, STANDARD DEVIATIONS AND INTERCORRELATIONS OF SELECTED OFFICER ATTRIBUTES AND DURATION OF ASSIGNMENT

Variables	N	Means[a]	SD	Control Branch	Basic Branch	Duty MOS	Primary MOS	Pilot Status	Temp. Grade	Perm. Grade	Months OS Service	Date of Birth	Date Availability	Date Return to CONUS	Exper. Date	Proj Date Retirement	Phys. Profile	Marital Status	Dependents
Control Branch[b]	682	.62	.49																
Basic Branch[b]	682	.61	.49	.99															
Duty MOS[b]	682	.50	.50	.27	.27														
Primary MOS[b]	682	.65	.48	.57	.57	.41													
Pilot Status	682	.09	.29	.22	.22	.14	.17												
Temporary Grade	682	3.03	1.22	-.16	-.15	-.30	-.12	-.01											
Permanent Grade	677	2.69	1.21	-.10	-.10	-.30	-.16	-.01	.73										
Months OS Service	452	53.4	28.30	-.05	-.05	-.22	-.11	-.12	.59	.55									
Date of Birth	676	31.4	8.13	.21	.20	.33	.22	.05	-.86	-.83	-.64								
Date Availability	385	65.6	1.43	.15	.15	-.02	-.03	-.14	.13	.08	.13	-.12							
Date Return CONUS	435	61.8	2.24	.21	.21	.24	.28	.04	-.27	-.32	.00	.34	-.10						
Expiration Date	380	62.0	3.58	.11	.11	.16	-.06	-.09	-.84	-.68	-.50	.79	.12	-.03					
Proj Date Retirement	359	74.7	6.11	-.03	-.03	.15	.01	-.03	-.72	-.69	-.71	.80	-.02	.16	.83				
Physical Profile[b]	676	.81	.39	.07	.08	.06	.06	.14	-.14	-.14	-.12	.15	-.04	.06	.13	.10			
Marital Status	671	.73	.44	.11	.11	.03	.17	.10	.28	.15	.14	-.19	-.04	-.04	-.25	-.27	-.07		
Dependents[b]	671	.75	.43	.08	.09	.01	.15	.10	.32	.19	.17	-.24	-.02	-.07	-.28	-.28	-.06	.34	
Date Last PCS	682	63.3	1.08	.16	.16	.28	.21	.06	-.45	-.40	-.24	.45	.00	-.42	.40	.33	.08	-.13	-.14
Turbulent-Non Turb.[b]	682	.75	.44	.18	.18	.31	.22	.10	-.38	-.35	-.25	.39	.02	.32	.28	.26	.07	-.09	-.10

[a] Coding is described on page 14.

[b] These variables have been arbitrarily dichotomized (See page 15).

Table 18

MULTIPLE CORRELATION COEFFICIENTS BETWEEN FOUR THREE-VARIABLE COMBINATIONS AND DATE OF LAST PERMANENT CHANGE OF STATION (Y_1) OR TURBULENT-NONTURBULENT (Y_2)

Variables	Y_1	Y_2
Date of Birth Date Returned to CONUS Duty MOS	.547	.467
Control Branch Temporary Grade Date Returned to CONUS	.551	.450
Primary MOS Temporary Grade Projected Retirement	.480	.422
Date of Birth Expiration Date Duty MOS	.484	.435

REFERENCES

1. Sorenson, R. C. Logical model representing personnel flow in the U. S. Army: Considerations relative to reduction of turbulence. Technical Research Note 156, U. S. Army Personnel Research Office, July 1965.

2. Sorenson, R. C. and Olson, Pauline T. Manpower rotation policy models. Technical Research Note 172, U. S. Army Personnel Research Office, June 1966.

3. Sorenson, R. C. A dynamic flow model for evaluating personnel supply and rotation policies. Paper given at Army Numerical Analysis and Computer Conference, 14-15 April 1966, Washington, D. C.

4. Olson, Pauline T. Nomograms for Army manpower policy evaluation. Technical Research Report 1147, U. S. Army Personnel Research Office, June 1966.

5. Olson, Pauline T. Manpower rotation models for combined career and noncareer systems. Research Study 66-6, U. S. Army Personnel Research Office, October 1966.